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Before the
Federal Communications Commission
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
)
Amendment of Parts 2 and 95 of)
the Commission's Rules to Create a)
Wireless Medical Telemetry Service)
)

ET Docket 99-255

COMMENTS OF ORBCOMM

Orbital Communications Corporation ("ORBCOMM") hereby comments on the Commission's proposal to allocate spectrum and to establish rules for the Wireless Medical Telemetry Service.¹ As explained below, ORBCOMM supports the Commission's proposal, in recognition of the problems that have plagued medical telemetry devices because of the secondary status of their operations to date.² However, in allocating spectrum and crafting service rules, the Commission must also take into account the requirements of the Little LEO satellite systems³ for additional spectrum for feeder links.

I. INTRODUCTION

A great deal of work has been performed by the Little LEO industry and others in an attempt to secure a global allocation of spectrum around 1.4 GHz for feeder link operations.

¹ *Amendment of Parts 2 and 95 of the Commission's Rules to Create a Wireless Medical Telemetry Service*, ET Docket No. 99-255, FCC 99-182, released July 16, 1999 (hereafter cited as "*Medical Telemetry NPRM*").

² *E.g., Medical Telemetry NPRM at ¶¶ 5-9.*

³ The data-only low Earth orbit ("LEO") satellite services using spectrum below 1 GHz are commonly known as Little LEO satellite services, and are alternatively referred to as Non-Voice, Non-Geostationary Mobile Satellite Services ("NVNG MSS").

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Although there may be some overlap between the proposed medical telemetry allocations and the proposed Little LEO feeder link allocations, both services should readily be able to share spectrum without risk of harmful interference, thereby advancing the public interest benefits of both of these valuable services. Thus, the Commission can achieve a “win-win” situation in this proceeding that benefits the public enormously.

ORBCOMM is very interested in this proceeding because of its role as a leader in the development of low-Earth orbit mobile satellite services and as the first commercial licensee and operator of a LEO satellite system.⁴ Although ORBCOMM does not intend to use the proposed feeder link spectrum around 1.4 GHz for its own operations, the availability of this additional spectrum will free up capacity in the currently designated Transit band (149.9-150.05 MHz) feeder link spectrum, and thereby allow ORBCOMM to transition its feeder link uplinks to the Transit band (and out of the service link frequencies). The Second Processing Round band plan proposed by the parties and adopted by the Commission explicitly contemplated that Final Analysis would migrate its feeder link operations to such new frequencies to make room for ORBCOMM in the Transit band.⁵

⁴ ORBCOMM filed the petition for rulemaking to allocate spectrum and develop service rules for Little LEO satellite services back in February, 1990. *Orbital Communications Corporation*, RM No. 7334, Public Notice Report No. 1814, April 4, 1990. The Commission subsequently adopted the proposed allocation, *Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum to the Fixed-Satellite Service and the Mobile-Satellite Service for Low-Earth Orbit Satellites*, Report and Order, 8 FCC Rcd 1812 (1993), and ultimately licensed ORBCOMM's NVNG MSS satellite system. *Orbital Communications Corporation*, Order and Authorization, 9 FCC Rcd 6476 (1994); *recon. denied*, 10 FCC Rcd 7801 (1995); *Second Round Authorization*, 13 FCC Rcd 10828 (1998).

⁵ *Amendment of Part 25 of the Commission's Rules to Establish Rules and Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Service*, 13 FCC Rcd 9111 (1997) at ¶ 65.

The Commission has already determined that the Little LEO satellite services well serve the public interest by making available efficient communications capabilities to unserved and underserved markets.⁶ ORBCOMM also believes that the record now amply demonstrates the need for additional spectrum for feeder links for Little LEO service, a view tentatively shared by the Commission in the World Radiocommunication Conference (“WRC”) preparatory process and recognized in the Second Processing Round for Little LEO applicants.⁷ The Little LEO licensees have had to make compromises to their system designs in order to all be accommodated in the limited amount of spectrum available for feeder links, and the additional spectrum will allow all of the systems to provide more robust services.

In response to the WRC-97 directive to undertake additional studies, an extensive record has also been developed in preparation for the upcoming WRC that demonstrates the need for additional feeder link spectrum to support the anticipated demand for Little LEO services and the sharing capabilities of the NVNG satellite systems. Thus, ORBCOMM believes that the need for additional feeder link spectrum for the NVNG satellite service is now established beyond dispute, and that the record also demonstrates

⁶ E.g., *Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum to the Fixed-Satellite Service and the Mobile-Satellite Service for Low-Earth Orbit Satellites*, Report and Order, 8 FCC Rcd at 1813.

⁷ *The FCC's Advisory Committee for the 2000 World Radiocommunication Conference Proposes Additional Preliminary Views on WRC-2000 Issues*, 13 FCC Rcd 21631 (1998); *The FCC's Advisory Committee for the 2000 World Radiocommunication Conference Offers Additional Draft Proposals on WRC-2000 Issues*, DA 99-1364, released July 14, 1999; *Amendment of Part 25 of the Commission's Rules to Establish Rules and Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Service*, 13 FCC Rcd 9111 (1997).

the flexible ability of the Little LEO systems to share spectrum on an interference-free basis. It is with this backdrop in mind that ORBCOMM addresses the Commission's proposal to allocate spectrum in the 1.4 GHz band to the Medical telemetry Service.

In the extensive efforts in the WRC process to obtain additional global allocations for feeder link spectrum, the Little LEO proponents have evaluated the availability and suitability of the various bands below 2 GHz for these purposes. As the Commission is well aware, these bands are very congested, and many of the current operations are incompatible with shared use of the band by the Little LEO satellite systems. This problem is exacerbated because of the need for a worldwide allocation, insofar as an incompatible allocation in even a small minority of countries can render a band unusable for these global Little LEO satellite systems.

Although the Little LEO proponents originally proffered several alternative feeder link bands in the WRC-97 preparatory process and conference, the only bands that were deemed suitable and available are the 1429-1432 MHz band for feeder link downlinks, and the 1390-1393 MHz band for feeder link uplinks. There simply were no other bands that appeared likely to be allocated on a global basis for Little LEO feeder links in the WRC process. Thus, the Little LEO industry has focused its attention and conducted numerous studies on these bands.

II. Sharing Between Both Services Is Readily Achievable

The *Medical Telemetry NPRM* proposes two options for spectrum allocation in the 1.4 GHz band for the medical telemetry service.⁸ Option 1 would allocate 8 MHz of spectrum in the 1.4 GHz band to the Wireless Medical Telemetry Service, specifically the 1395-1400 MHz and

1429-1432 MHz bands. Under Option 2, a single 9 MHz band of spectrum (1391-1400 MHz) would be allocated to the Wireless Medical Telemetry Service. Under both options, there would be some overlap between the allocations to the Wireless Medical Telemetry Service and the bands being sought by the Little LEO proponents for feeder link operations. In the case of Option 1, one of the two proposed medical telemetry allocations in the 1.4 GHz band (1429-1432 MHz) and the proposed Little LEO feeder link downlink (1429-1432 MHz) would be the same. In the case of Option 2, the proposed Little LEO feeder link uplink (1390-1393 MHz) would partially overlap the proposed 1.4 GHz band medical telemetry allocation (1391-1400 MHz).

Although there is some overlap under the proposed allocations, ORBCOMM believes that both services should be able to operate compatibly with minimal operating restrictions under either of the options. Under Option 2, however, there would be fewer constraints on either service, making Option 2 a somewhat better choice from the Little LEO satellite system perspective.

Sharing between the two services is aided by the fact that Little LEO satellite systems propose to use the 1.4 GHz spectrum strictly for feeder link operations. As a result, the spectrum will be used at only a limited number of gateway Earth stations, and those stations are expected to be located in highly remote areas.⁹ Indeed, there are numerous reasons why the gateway Earth stations are located in highly remote areas. The absence of other radio transmitters minimizes

⁸ *Medical Telemetry NPRM* at ¶¶ 22-23. In addition to the 1.4 GHz allocations, both options include an allocation of the 608-614 MHz band to the Wireless Medical Telemetry Service.

⁹ By way of example, ORBCOMM maintains its satellite constellation and provides service to the Continental United States through four gateway Earth stations located in rural, unpopulated areas: Arcade, New York (Call Sign No. E940535); Ocilla, Georgia (Call Sign No. E940536); St. John, Arizona (Call Sign No. E940537); and East Wenatchee, Washington (Call Sign No. E940538).

the risks of interference into the Little LEO gateways. The low cost of land in rural areas is also an important factor, because the gateway complexes are relatively large (with multiple radomes at each site). In addition, the absence of other buildings or structures in the immediate vicinity of these remote locations gives the tracking antennas an unimpeded view in all directions.

With respect to the feeder link downlinks (in the 1429-1432 MHz band) from the satellites to the gateways, ORBCOMM does not believe that the transmissions will cause harmful interference to the wireless medical telemetry devices. Presumably these medical telemetry devices will be used indoors (or at least any outdoor use could be restricted to the 608-614 MHz band). Moreover, particularly if the feeder links used a spread spectrum modulation scheme, then the resulting low power at the surface of the Earth (approximately -152 dBW/m²/4kHz) would not radiate inside of buildings.¹⁰ Thus, there would not be any interference by the feeder link downlinks to the wireless medical telemetry devices, even if there was overlap in spectrum use between the Little LEO satellites and the wireless medical telemetry devices under Option 1. Alternatively, if the Commission adopts Option 2, then there would not be any overlap between the feeder link downlinks and the wireless medical telemetry devices, eliminating any interference concerns altogether.

With respect to transmissions by the gateway Earth stations (the feeder link uplinks in the 1390-1393 MHz band), there are unlikely to be any large hospitals in near proximity to the rural

¹⁰ ORBCOMM believes this is a conservative estimate based on the system design of E-SAT, Inc. ("E-SAT"), another Little LEO satellite system that will use spread spectrum transmissions in its system. E-SAT, in their October 28 1997 filing at Table VII, indicates that its maximum PFD/4 kHz for the spread spectrum downlink is -152.86 dBW/m²/4kHz. However, even lower power levels are possible, because E-SAT is proposing to use a relatively small antenna (7.61 dBi), so that a reasonably sized antenna could reduce the PFD substantially.

gateway sites.¹¹ Moreover, if there was any hospital near one of the gateways, it is possible to program the tracking antennas so that a “notch” is created in the direction of the hospital.¹² As a result, the antennas would not transmit in the direction of the hospital, thereby preventing any harmful interference.¹³

In addition, ORBCOMM observes that any hospitals in rural areas where gateway Earth stations are likely to be located will not be very large. Presumably, the spectrum needs for such low-density medical telemetry usage would likely be relatively small. As a result, the wireless medical telemetry devices in those remote hospitals could be accommodated solely in the 608-614 MHz band. Alternatively, if the Commission adopts Option 2, then there would still be 7 MHz of spectrum (the 1393-1400 MHz portion of the 1391-1400 MHz band) in which there would be no overlap between the gateway feeder links and the upper band wireless medical telemetry allocation. Thus, it should be easy to coordinate the spectrum assignments so that there

¹¹ With respect to the ORBCOMM gateways, this is certainly the case: (i) Ocilla, Georgia is the County seat of Irwin County, which is in far South Georgia, not near any major cities. The County population is 8,871, and Ocilla itself has 3,189 inhabitants. The one hospital, Irwin County Hospital, has 64 beds; (ii) St. John, Arizona is located in Apache County, eastern Arizona, on the major highway route between Phoenix and Albuquerque New Mexico. The entire county has about 69,087 people, and there are four small hospitals, with a total of 45 beds among the four health care facilities; (iii) Arcade, New York is in Wyoming County, in far western New York, and the County has a population of only 44,357 people. Arcade is a small township that is some 10-15 miles to the County seat. There is one hospital in Warsaw, the County seat, with 174 beds; and (iv) East Wenatchee, Washington is located in Douglas County, which has a population of 31,400. East Wenatchee itself has a population of 5,320. Douglas County apparently has no hospital, but East Wenatchee is across the river from Wenatchee, where Central Washington Hospital is located, with 176 beds.

¹² As a general matter, the Earth stations do not track or transmit to the satellites when they are less than 5 degrees above the horizon, so that any such “notching” will not significantly constrain the Little LEO satellite system operations.

¹³ Indeed, ORBCOMM employed such an interference mitigation technique to allay any concerns that its Arcade, New York gateway would interfere with an ambulance paging service in Toronto, Canada.

would be no overlap in spectrum use between the gateway uplinks and any wireless medical telemetry devices in hospitals in rural areas near any Little LEO gateway.

In addition, in order to ensure that such coordination can occur, the Commission should require that wireless medical telemetry devices be tunable and able to operate in both the lower (608-614 MHz) or upper (1391-1400 MHz) band, or at least across the entire upper band. Such flexibility in the medical telemetry devices would facilitate sharing between the two services in the unlikely event that a medical facility was sufficiently close to a Little LEO gateway Earth station such that interference from uplink transmissions was a possibility, because the medical devices could then be set to operate in the 608-614 MHz band or the portion of the upper band (1393-1400 MHz) in which there would be no overlap.

III. ORBCOMM Prefers Option 2

As discussed above, ORBCOMM believes that the Little LEO feeder links could share the spectrum with the wireless medical telemetry devices under either of the options proposed in the *Medical Telemetry NPRM*. Under Option 1, there would be overlap between the feeder link downlinks and the medical telemetry devices, but the downlinks would operate at such a low power so as not to cause any interference to in-building medical operations. Under Option 2, the potential overlap would occur with the feeder link uplinks, but it should be easy to coordinate the spectrum use of the medical telemetry devices so that there was no overlap in any hospitals in rural areas located near the Little LEO gateways.

As between the two options, ORBCOMM favors Option 2. Although this would entail some coordination between the Little LEO satellite system operator and the medical telemetry device operators, the number of any such coordinations would be minimal (since there would

only be a small number of gateways) and the Commission is otherwise establishing a coordination process to resolve conflicts among medical telemetry device operators.¹⁴ Under Option 1, there would likely need to be limits on outdoor usage of the medical telemetry devices in the 1429-1432 MHz band, and also constraints on the Little LEO feeder link operations to ensure that the power levels are sufficiently low that no in-building interference will occur. Although spread spectrum makes such feeder link downlinks possible, the satellite system operators would then be limited to using spread spectrum techniques. Thus, Option 1 would limit somewhat the flexibility of the Little LEO operators in their satellite system designs, as well as constraining outdoor use of medical telemetry devices. ORBCOMM thus believes that Option 2 is preferable.

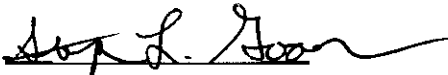
IV. Conclusion

The Commission is faced with two different services seeking access to use some of the same spectrum in the 1.4 GHz band. Both the medical telemetry devices and the Little LEO satellite systems provide beneficial services to the public. The Commission, however, need not choose between these two services, because as demonstrated herein, both services can share the spectrum. With respect to the two alternatives proposed in the *Medical Telemetry NPRM*, ORBCOMM prefers Option 2. In any event, ORBCOMM urges the Commission to move ahead expeditiously with the allocation of spectrum for the Wireless Medical Telemetry Service, as well as continuing its efforts to obtain a global allocation of the 1429-1432 MHz and 1390-1393 MHz bands for Little LEO feeder links (followed as soon thereafter as possible by a domestic

¹⁴ *Medical Telemetry NPRM* at ¶¶ 29-32.

allocation of that spectrum). Such action will well serve the public interest by fostering the availability of both services, and by making efficient use of a scarce resource -- spectrum.

Respectfully submitted,

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